

SYSTEMS AND METHODS FOR SEGMENTING AND DISPLAYING TUBULAR VESSELS IN VOLUMETRIC IMAGING DATA

ABSTRACT

5 This document discusses, among other things, systems and methods for
segmenting and displaying blood vessels or other tubular structures in volumetric
imaging data. The vessel of interest is specified by user input, such as by using a
single point-and-click of a mouse or using a menu to select the desired vessel. A
central vessel axis (CVA) or centerline path is obtained. A segmentation algorithm
10 uses the centerline to propagate a front that collects voxels associated with the
vessel. Re-initialization of the algorithm permits control parameter(s) to be adjusted
to accommodate local variations at different parts of the vessel. Termination of the
front occurs, among other things, upon vessel departure, for example, indicated by a
speed of front evolution falling below a predetermined threshold. After
15 segmentation, an analysis view displays on a screen a 3D rendering of an organ or
region, along with orthogonal lateral views of the vessel of interest, and cross-
sectional views taken perpendicular to the centerline, which has been corrected
using the segmented volumetric vessel data. Cross-sectional diameters are
measured automatically, or using a computer-assisted ruler, to permit assessment of
20 stenosis and/or aneurysms. The segmented vessel may also be displayed with a
color-coding to indicate its diameter.